

# Ref 5.8P.1 Gwili Gwendraeth Investment Case

September 2018





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# **Executive summary**

## **Driver for investment**

The key driver for this investment is discharge permit changes at our assets to improve river water quality in the Gwili and Gwendraeth rivers in Carmarthenshire, South West Wales. These new legal obligations, are included in National Resources Wales' (NRW) National Environment Programme (NEP).

Other drivers for the scheme are:

- Growth the region is experiencing rapid industrial, commercial and population growth that is forecast to continue, with an 54% increase projected between 2016 and 2036;
- Running costs stricter compliance limits and increasing plant complexity are driving up costs for processing wastewater, beyond that which is cost effective at a small scale;

## The investment

To achieve our customer outcomes and meet new legal obligations reliably in the future, we need to invest in the wastewater treatment works (WwTWs) in this operational area. We have looked at the various options, including catchment management, and have identified that the best option for our customers is to invest in a new treatment works.

The Gwili Gwendraeth Wastewater Treatment Scheme is proposed to replace seven of the eight ageing WwTWs that discharge treated effluent into two of our most environmentally sensitive rivers. The seven treatment works will be replaced with a single works discharging into a tidal estuary. This offers a lower whole life cost solution with significantly better environmental outcomes than upgrading the existing sites.

This initiative will contribute to the delivery of our Welsh Water 2050 strategy by modernising our approach to wastewater treatment in this area. Investing upfront will provide greater efficiency and will be more affordable for our customers in the long-term. It is an example of our innovative thinking, re-framing our response to challenges with a long-term multi catchment-based approach.

At 2017-2018 prices, our proposed AMP7 capital expenditure on this project is £44.7m 'post-efficiency', based on modelled costs less an efficiency challenge deduction.



## Delivering for our customers

This work will meet the following of our customer promises:



**Safeguard our environment for future generations**: We are improving 38km of the Gwili and Gwendraeth rivers which will contribute to achieving a 'Good' status under the Water Framework Directive (WFD).

**Fair bills**: Providing cost savings compared to upgrading each of the individual WwTWs which can be passed on to our customers through affordable bills over three AMPs.

#### Delivering for the future

In Welsh Water 2050, we identified future trends. The requirement for this investment is driven by the following trends:



**Demographic change**: Rapid industrial and commercial growth is predicted in these catchments leading to increased service demand.



**Climate change**: More frequent and extreme weather events have the potential to adversely impact upon the rivers in this catchment.



**Protecting essential infrastructure**: The existing seven WwTWs are ageing. We know that the majority of assets at the works are either in poor condition or will reach the end of their useful life in the next five to ten years.



**Policy and regulation change**: The current discharge loads into Gwili and Gwendraeth from the existing WwTW are considered relatively high. Some of these works have very strict discharge consent limits and regulatory changes to reduce permitted phosphorus limits could make compliance at these works inefficient.

### Delivering our strategic responses

In Welsh Water 2050, we set out to deliver eighteen strategic responses. This investment will contribute to the following:



**Ensuring affordability of services delivered to customers:** ensuring that our services remain affordable for all customers through implementing the lowest cost and highest value options.



**Cleaner rivers and beaches:** contributing to achieving 'Good' environmental status for our rivers, lakes and coastal waters by removing discharge points into two environmentally sensitive inland rivers.

**Protecting our critical wastewater assets**: improve resilience of our critical wastewater assets which are ageing and have high environmental and customer impacts of failure. This will remove the service and environmental risks these WwTW currently pose.

## Achieving our measures of success

For PR19, we will measure our performance based on measures of success (MoS). This investment will contribute to achieving the following MoS:

Measure of Success	End of AMP6 position	End of investment position
C12 Environment: km of river improved	-	38km improvement



# 1 Delivering our customer outcomes

### Need for investment for customers

The Gwili and Gwendraeth Fawr rivers are located in Carmarthenshire, South West Wales. The rivers receive treated effluent from eight of our WwTWs (Cross Hands, Cwmtawel, Cwmgwili, Llanedi, Pontyberem, Pontyates, Carway and Trimsaran). These collectively serve a population of more than 25,000 people.

Both rivers are currently failing the water quality requirements of the WFD to achieve the target status of 'Good'. Given the rivers' small size, the current discharge loads from the WwTWs are considered relatively high. Some of these WwTWs have strict discharge consent limits, which are the strictest in our whole operating area.

We undertook water quality modelling on the Gwili and Gwendraeth Fawr rivers. We found that to achieve 'Good' status, improvements would be required at all of the existing WwTWs. This would require significant capital investment and increased operational spend. It potentially increases the risk of future compliance failure, as relatively unproven technology may need to be installed to achieve consent limits.

There is limited space at the existing WwTWs for the installation of new processes. This is due to the age of many of these works, which range from 60 to 80 years old. These sites have been expanded and modified in various ways to meet emerging needs, leaving complex works which are difficult and expensive to maintain and operate.

The majority of assets at the existing works are either in poor condition or will reach the end of their useful life in the next five to ten years. The sites are currently operating at a heightened risk of compliance failure and pollution incidents.

This creates an opportunity to do something different for our customers and the environment.

# Views of our customers and stakeholders

Customers are at the heart of everything that we do and the views of customers and stakeholders shape our plans. We have undertaken extensive consultation with our customers through our PR19 preparation programme, including our Welsh Water 2050 strategy<sup>i</sup> consultation held in summer 2017, which engaged with 19,980 of our customers.

We found that our customers think that Welsh Water should have a strong environmental conscience<sup>ii</sup>. They place great importance on clean rivers and beaches – both for their own pleasure, wildlife and for the tourism industry in Wales<sup>iii</sup>. The idea of sewage or industrial pollution in rivers is upsetting for many and detrimental to business.<sup>iv</sup> Therefore, improving the quality of river and coastal waters in our region is important.

Feedback from customers and stakeholders showed that protecting our essential wastewater assets is also critical to our customers, who recognise their importance for the continuation of our service provision. Our customers are keen for us to also consider innovative ways to improve the resilience of our assets to threats like climate change and flooding<sup>v</sup>.

## Benefits for our customers

#### **River quality**

The Gwili Gwendraeth Wastewater Treatment Scheme will help us to improve the water quality of two of our most environmentally sensitive rivers. In total, it will lead to the improvement of 38km of river, supporting achievement of WFD 'Good' status for the Gwili and the Gwendraeth Fawr rivers. Their current status is shown in Figure 2. Seven existing continuous wastewater discharges will be completely removed.



#### Economic growth

This investment will support the development that is occurring at Cross Hands, which in turn supports the economic development of the region for the benefit of our customers and Welsh society. This growth must be supported by our wastewater treatment provision, see Figure 1. The Cross Hands Strategic Employment Site plans to be the next major employment zone in Carmarthenshire, providing 600 jobs. This will increase the trade effluent load, meaning that increased capacity will be needed at Cross Hands WwTW.

#### Resilience of our wastewater treatment

Creating one combined WwTW will also improve the reliability and resilience of our service provision. Ageing assets have a higher risk of failure and associated service impacts such as pollution. The new facility would be built to the latest design standards.

#### Cost savings

Creating one combined WwTW will provide us with cost savings through reduced avoidable costs, operational expenditure (opex) and maintenance costs. We can take advantage of an unconstrained site, reducing construction costs and allowing for future site expansion. We plan to use the latest treatment technologies to create an efficient works that reduces our long-term costs. We will pass these savings on to our customers through affordable bills and customer dividend.



Figure 1: Map of the Gwili and Gwendraeth region



# 2 Investing for now and in the long-term

## Future challenges

Our strategy, Welsh Water 2050, identifies significant trends over the next 30 years, and how these will impact on us and our customers. The trends that provide the most significant challenge for Gwili Gwendraeth WwTW are set out below.

#### Demographic change

- Population change and economic development in the area mean that significant capacity improvements will be required to meet future demand. Projected growth in Carmarthenshire's population is 8% from 2016 to 2036, one of the highest growth rates in Wales<sup>vi</sup>. By 2036, the overall population equivalent served by the WwTW, covering the Gwili and Gwendraeth Fawr river catchments is forecast to increase by approximately 54%.
- There are also significant projected increases in demand at Cross Hands, which has grown rapidly as an industrial and commercial centre. Continued growth is expected as Cross Hands becomes a major regional hub, as a growth zone linked to the Swansea Bay Region City Deal<sup>vii</sup>, with a 60% increase in population, and expansion of the industrial parks. This growth is also expected to spill over into the Pontyberem catchment, which also shows signs of significant growth. This growth will be significantly above Welsh averages, in the catchment of one of the most sensitive river valleys in Wales.
- Plans to further develop the Ffos Las racecourse site are expected to significantly increase loads at the Carway and Trimsaran WwTW. The development will include housing, hotel and leisure facilities and will result in a two-fold increase in the population equivalent served at Trimsaran WwTW.

#### Climate change

 More frequent or extreme rainfall events are expected to place an increased burden on the existing WwTW. A number of the works have storm flow consents, including Pontyberem, Cross Hands, and Pontyates. Climate change may therefore exacerbate the future capacity pressures caused by population growth and economic development in the catchments.

#### Policy and regulatory change

- The existing WwTWs were originally built with a relatively small footprint, and have since been modified to meet emerging wastewater treatment standards, improving work practices and to incorporate new technology. These existing works are in an area with the tightest consents currently in Wales. This means that our running cost are higher relative to a modest population equivalent.
- Future increased flows at the WwTWs as a result of population growth will trigger the tightening of environmental permits at a number of sites, including Cross Hands, Carway and Trimsaran. We have included forecasting of consent limits in the analysis undertaken for this business case.
- Future regulation will be harder to meet if we retain the existing seven sites as the technically achievable limit reduces.

#### Legal duties

The seven sites discussed in this investment case are covered by environmental legislation, which is regulated by Natural Resources Wales (NRW).

- The AMP6 NEP set a completion date for phosphorus removal schemes to serve Cross Hands and Cwmgwili WwTWs of December 2021. However, our preferred long-term solution is to transfer these flows to the new Gwili Gwendraeth Wastewater Treatment Scheme. NRW recognise the key environmental benefits that the scheme will bring.
- The AMP7 NEP is still under discussion with NRW but the current version allocates Water Framework Directive drivers for all seven of the sites involved in this case due to the rivers they discharge into being classed at "Moderate" status under the Water Framework Directive.

## Planning for the future

#### Long-term planning

 Our Welsh Water 2050 vision outlines our long-term direction of travel to contribute to a wider societal programme to achieve 'Good' status amongst all the rivers where we are the confirmed or suspected cause of water quality



issues. The Gwili Gwendraeth Wastewater Treatment Scheme is an important part of this strategy.

• The long-term planning approach adopted in development of this scheme aligns well with the ethos of our Welsh Water 2050 vision;

helping us to plan ahead and earn the trust of future generations of customers. We are making difficult forward-looking decisions today in order to protect our customers tomorrow.



# 3 Options

# Background

The Gwili and Gwendraeth Fawr rivers receive treated effluent discharged from eight of our WwTWs. The rivers and the works that discharge into them are listed below:

- Gwili River: Cross Hands, Cwmtawel, Cwmgwili and Llanedi.
- Gwendraeth Fawr River: Pontyberem, Pontyates, Carway and Trimsaran.

The need for investment and the strength of customer support to deliver appropriate strategic responses has been set out in the first section of this document.

We have undertaken an optioneering exercise to identify our preferred option to meet these challenges – the Gwili Gwendraeth Wastewater Treatment Scheme.

## **Options**

We have applied a three-stage optioneering process that allows a proportionate approach to be adopted to the assessment of options:

- 1. Preliminary assessment;
- 2. Feasibility study; and
- 3. Preferred option.

## Stage 1: Preliminary assessment

A traditional approach to improving the quality of discharges would have involved looking at each site individually. However, due to the high costs involved in this siloed approach and the proximity of the sites we recognised the potential to take a different approach.

The preliminary assessment commenced in 2014 and involved a high-level appraisal of the options that might be applied to address the problem.

The process was used to exclude options that were not considered operationally or commercially viable, and to shape the direction of the more detailed analysis in Stage 2. The Stage 1 assessment concluded that:

- Our study area should be limited to WwTWs in the Gwili and Gwendraeth Fawr valleys. Other WwTWs were considered, but found to be too far away to offset the costs of flow transfer.
- Llanedi WwTW which is also located in the Gwili valley, was deemed to be too distant from the other sites to benefit from inclusion. Early options to combine flows from all four works in the Gwili valley (including transfer to an estuary discharge), were all significantly more expensive than options which excluded Llanedi.
- A two-works option one new WwTW for the four Gwendraeth catchments and one new WwTW for the three Gwili catchments – was found to be significantly more expensive than the single works option. Further sub-options were also found to be less financially viable than the single works option.
- We considered the option of using the Felin Fach Site of Special Scientific Interest (SSSI) as a way to reduce phosphorus discharge in the Gwili catchment. We found that this was not a viable option. We considered this as part of our AMP6 NEP investigations but have concluded that phosphorus loadings from surrounding plants are far in excess of the land area available under accepted loading rates. This would effectively destroy the natural features of this SSSI and therefore we have discounted it as a potential solution.
- Water quality modelling using a 'source apportionment' approach has shown that the majority of phosphorous (~75%) originates from our WwTWs. The WFD target 'Good' status cannot be achieved unless the phosphorous loads discharged from our WwTWs are reduced. Working with farmers to reduce agricultural inputs, i.e. in a catchment management approach, will be beneficial but not sufficient on its own to achieve the required standards.

The options that were considered worthy of more detailed scrutiny were included in the feasibility study, which commenced in 2016.



# Stage 2: Feasibility study

#### Option 1: Existing works upgrade

Having discounted Llanedi in stage 1, this option sees the seven existing WwTWs retained and upgraded individually to meet both the tightened effluent standards and growth up to a design horizon of 2036.

Since each site has an assortment of assets of varying ages, the process also assessed the condition of these existing assets to determine which may be reused and which are likely to require replacement before 2036.

The upgrade options for each of the existing WwTWs were developed taking account of site constraints and environmental considerations. To provide a comprehensive approach, up to two sub-options were considered for the upgrade of each WwTW. The sub-options reflect the varying extents of investment that might be possible at the existing works.

Conceptual designs were developed for upgrading each sub-option and were reviewed through a series of Risk and Value workshops. The workshops were used to assess the benefits, constraints, residual risks and costs associated with each sub-option. On this basis, a preferred sub-option was identified for each WwTW.

#### Option 2: New works rationalisation

This option involves the decommissioning of each of the existing seven WwTWs and the piping of wastewater through a new sewer to collect and convey the flows to a new WwTW. The new works would be constructed near the mouth of the Gwendraeth Fawr and serve a population equivalent of approximately 40,000. Treated effluent would be discharged into the tidal estuary.

Our analysis of this option included the development of outline process designs for alternative treatment sub-options. It also considered a range of operational and design issues, including (but not limited to) the proportion of flows to be conveyed to the new WwTW and the effluent discharge standards that might be typical to comply with various directives (for example the Urban Wastewater Treatment Directive, Bathing Water and Shellfish Waters Directive).

NRW has provided guidance on the environmental permit limit likely to be enforced and we have used this in our outline designs.

More information on the sub-options considered can be found in the Feasibility Study Report<sup>viii</sup> undertaken in partnership with our capital delivery partners, Mott Macdonald Bentley (MMB).



Figure 2: The current WFD ratings for the catchments and rivers in this area



# Stage 3: Assessment of preferred option

The conceptual designs were used to produce cost estimates to inform our appraisal. This included consideration of the cost requirements of different sub-option combinations across the existing seven works compared to the single combined works.

Initial costs were compiled using our Unit Cost Database (UCD) model. The model uses our own historic capital cost data to provide a bottom-up estimate based on different assets and their characteristics, such as type, size, and length. A strength of this approach is that the costs draw on the actual costs we have encountered across a range of capital projects.

Table 1 presents the costs for both options. For option 1 (the retention of the existing seven works) we have presented the combination of sub-options for each WwTW that provides the lowest possible whole life cost (WLC) solution. Detailed cost breakdowns for the upgrading of individual sites in option 1 can be found in our Feasibility Study Report. For option 2, costs were estimated for two treatment variants of the new works. The costs of the two sub-options are closely matched. We have presented the costs for the activated sludge plant (ASP) sub-option in Table 1 below, however we intend to explore the optimal treatment approach in more detail as we enter detailed design.

The cost comparison shown in Figure 3 reveals that although the lowest WLC of option 1 offers the lowest initial capital expenditure, option 2 becomes less expensive after approximately 16 years.

This is because option 2 has lower operational costs (operating one large works is cheaper than operating multiple smaller works<sup>1</sup>) and because substantial investment is required at years 5 and 10 under option 1 to replace and upgrade existing assets at the seven WwTWs.

We arrived at our preferred option by weighing up both the costs and benefits that each option would provide to our customers.

Option	Sub-option or combination	Capex (£k)	40yr repeat capex (£k)	Opex (£k/yr)	40yr Whole life Cost (NPV) <sup>2</sup> (£k)
1: Existing works upgrade	Lowest WLC combination	33,156	44,704	1,454	113,739
2: New works rationalisation	Activated sludge plant	50,830	17,435	937	97,388

Table 1: Options 1 and 2 – Forecast costs (16/17 price base, pre-efficiency)



Figure 3. Option cost comparison (40-year preefficiency WLC). Option 1 shown in blue and Option 2 in Red.

<sup>1</sup> Costs of operation are lower even when the pumping costs of transferring the new flows to the new works are included.

<sup>&</sup>lt;sup>2</sup> Whole life cost in present value terms



# 4 Preferred option

## **Preferred option**

Following our appraisal of the two options and their associated sub-options, we determined that option 2, the introduction of a new WwTW at the mouth of the Gwendraeth Fawr, would provide significantly greater benefits at a lower overall cost.

The benefits of rationalising the seven works into one are derived both from the opportunities provided by a new, relocated, modern specification works *and* the avoidance of the current and future challenges that face many of the existing works.

Benefits include:

- The removal of seven continuous wastewater discharges into the Gwili and Gwendraeth Fawr rivers. This would lead to the improvement of 38 km of river and support achieving WFD 'Good' status.
- Increased confidence of meeting the effluent discharge standards now and long term.
- Under option 1, there was considered to be a residual risk that effluent consents would be subject to future tightening. Modelling suggested that an effluent quality of 0.5mg/l P for each works would not achieve 'Good' status for the waterbodies. Consents for the existing works will also be subject to future tightening as the catchment grows.
- The opportunity to design the works to allow for future expansion.
- Energy efficient processes and intelligent operation.
- Lower levels of operational intervention would be required compared to retaining seven individual sites - where plant and equipment are old.
- Improved operator access and operator health and safety than the existing sites.
- An offline construction with the existing sites continuing to operate during the introduction of the new works.
- Retaining and upgrading the existing works under option 1 would be complicated by the necessity to keep the existing works operational throughout the construction. It

would also be constrained by the existing above and below ground assets.

- Under option 1, land purchase would be required at numerous sites since in many cases the required upgrades cannot be accommodated on existing site footprints.
- Under option 1, large scale replacement of site assets would be required in the short to medium term if they were to meet the effluent discharge standards.
- Under option 1, two of the more recently upgraded works where some assets have not yet reached their end of service life (Pontyberem and Cross Hands) would still require major capital spend in the short to medium term. Upgrades would be needed to the main treatment plant and associated up and downstream processes to meet growth and tightened effluent standards.

## Cost

At 16/17 prices, our preferred option for the Gwili Gwendraeth Wastewater Treatment Scheme will have a 40 year pre-efficiency totex of £97.4 million, and a total pre-efficiency capex of £68.3 million. Roughly half of this cost is for the new WwTW and half is for the new transfer mains and pumping stations.

£50.8 million of the pre-efficiency capex is budgeted for delivery in AMP7, with the remainder representing repeat capex over a period of 40 years. Our estimated capital maintenance spend would need to be £1.4 million in AMP7, if the NEP obligations were not imposed, and only maintenance was required.

We are presenting this option as a special factor case as it meets Ofwat's direct procurement criteria. We have chosen to progress the scheme because we believe it offers a lower-risk approach with significantly better environmental outcomes than Option 1.

The scheme offers a lower WLC solution. Whilst in the long-term the scheme will lower the bills of our customers, it does result in the front-loading of much of this investment into AMP7, as shown in Figure 3.



# 5 Cost efficiency and innovation

# Summary of innovation in this project

The Gwili Gwendraeth Wastewater Treatment Scheme is an example of our innovative thinking: re-framing our response to challenges with a long-term multi catchment-based approach.

The scheme will also benefit from a number of innovative practices, including but not limited to:

- Cost savings as a result of our smart network

   treatment processes can be optimised using real-time data, leading to reductions in energy and chemical use. Advanced monitoring is also expected to reduce the need for reactive maintenance by providing timely information to operators; allowing flexible responses to changing site conditions.
- Forward planning for growth our 2050 strategy is helping to engrain a long-term focus in our decision making. We recognise the importance of planning to secure the longterm value of this scheme, and this means taking steps in the design to make sure that the new network is able to readily support the areas that are forecast to grow the most.
- Efficient design for the environment we will maximise the opportunities presented by the topography to use gravity sewers wherever possible and keep rising main lengths to a minimum. This reduces the risk of septicity, as flows are not retained in an anaerobic environment for long periods.

Further opportunities for innovation will also be explored and actively encouraged as the scheme progresses to detailed design. Development of a new, unconstrained site will allow us greater scope to exploit opportunities, and we will focus on minimising the long-term running costs of the works.

## Partnering and co-creation

One of the ways we are already working differently is by drawing on the insight of our customers and stakeholders in the development of many of our projects. We aim to foster an inclusive approach at the outset of any scheme in order to maximise the benefit of a broad spectrum of insight and ideas. We believe that working in this way to co-create solutions will bring real value to the work we do.

Partnership working and third-party collaboration is a central part of our delivery strategy. We regularly engage with key stakeholders, such as The Welsh Government, NRW and local government. We also place great importance on our participation in partnerships with a range of other stakeholders, such as Public Service Boards, the Green Seas Partnership, the Independent Environmental Advisory Panel (IEAP) and catchment scale partnership groups. These relationships not only help us to develop schemes that directly improve the services we offer to our customers, but also provide schemes consistent with the wider aspirations of Wales, contributing to the national policy agenda, such as the goals from the Well-being of Future Generations (Wales) Act 2015.

Being close to our customers and stakeholders allows us to better shape our investment priorities and develop schemes such as the Gwili Gwendraeth WTW scheme, which has strong alignment with what our regulators demand and what our customers and partners value.

Following extensive consultation as part of our 2050 strategy, we know that our customers share our strategic ambition to upgrade our WwTW and reduce outflows from our sewerage network in instances where we have a material role to play in achieving good ecological quality for our rivers and beaches. We intend to continue to work closely with our customers and stakeholders to make sure that the Gwili Gwendraeth Wastewater Treatment Scheme is reflective of their needs.



# 6 Value for money and affordability

### Impact on customer bills

The replacement of seven underperforming WwTWs with one new works has been identified as our preferred solution for a number of reasons. It will provide greater certainty of water quality and environmental compliance and help to protect our valuable natural resources.

It will deliver these benefits whilst providing financial savings compared to the costs of continued maintenance and upgrades to our existing sites.

Though delivery of this scheme provides longterm financial benefits, it means that we need to invest more than usual in AMP7. We are asking our customers to contribute £44.7m (2017/18 prices, post-efficiency) to fund these improvements. We believe this represents the best value approach for both current and future customers.

Due to our unique customer ownership model, the costs savings accrued in the future will be passed on to our customers through affordable bills and customer dividends.

## Value for money

We understand the need to demonstrate value for money in everything that we do. In arriving at our preferred solution to the challenges in the Gwili and Gwendraeth Fawr river catchments, we have closely considered the financial requirements of different options and sub-options to make sure that any investment represents value to our customers.

As part of our feasibility assessments we have assessed the required Net Present Value (NPV) totex over a 40 year planning horizon. Some of the key financial headlines are shown below.

Section 3 of this document provides more information on how these figures compare with the cost of alternative options and concludes that whilst the new works will require a higher initial capex, it remains less costly than other options over a 40 year period.

We are ensuring value for money by challenging our Alliance Partners to improve efficiency. This equates to a reduction of 14% from our UCDmodelled costs.

Headline costs				
Capex AMP7	£50.81m			
Capex (NPV) 40 years	£68.3m			
Totex (NPV) 40 years	£97.4m			
Payback Period	16 years			

Table 2: Headline costs for the Gwili Gwendraeth scheme (Pre-efficiency, 16/17 prices)



# 7 Delivery

## Procurement

This investment meets the criteria for Direct Procurement for Customers (DPC). This is our main driver for putting forward this investment case as a special cost adjustment.

Once the full scope of work has been defined we will undertake a procurement assessment to select the most cost effective way to deliver the project.

## Programme

It is critical that scheme delivery is aligned to meet our obligations under the National Environment Programme. The output date for phosphorus removal schemes to serve Cross Hands and Cwmgwili WwTWs is December 2021. However water quality modelling has now confirmed that phosphorus removal is required at all seven of the existing works.

Our preferred approach of rationalising the existing works into one new works is a significant undertaking and we are therefore currently working closely with NRW to agree an acceptable and achievable target completion date.

We are confident that the Gwili Gwendraeth Wastewater Treatment Scheme will provide the best environmental outcome by completely removing seven continuous wastewater discharges from inland waters and believe that delivery of this major scheme within the first few years of AMP7 would be acceptable to NRW.

Our high-level programme for completion is currently as follows:

- July 2014 October 2016 Preliminary assessments – complete
- October 2016 September 2017 Feasibility study - complete
- September 2017 April 2019
   Environmental studies, impact assessments, Habitats Regulations Assessment
- April 2019 May 2020 Detailed design

- May 2020 March 2022 Construction
- March 2022 March 2023 Commissioning and handover

Where advantageous, we will explore opportunities to advance the progression of the scheme by working closely with NRW and our delivery partners.

# Risk mitigation and customer protection

As part of our feasibility assessments, we have sought to understand and document the key risks associated with the planning and delivery of the project. This information will feed into a risk register that we will use throughout the delivery of the project to actively manage risk – by continually identifying areas of risk and implementing mitigation measures.

We recognise that the biggest uncertainties associated with the project are the following:

- Our ability to purchase the land for the site;
- Our ability to achieve planning permission;
- Our ability to meet regulatory deadlines for delivery;
- The requirement to lay additional sewage pipelines and the potential disruption to our customers and local landowners during the build;
- The findings from environmental impact, spill, and habitat regulations assessments which may reveal challenges that affect the scheme design
- The findings from any WFD compliance assessment
- The findings of coastal modelling undertaken to understand the impact on the estuary and need for a marine license;
- Ground condition and services, which are currently unknown;
- The potential need to provide compensation water; and



Objections from the local council or customers could cause delays to the above or result in a less effective site to be chosen. Until detailed feasibility has taken place there remains considerable uncertainty in the project costs. Some mitigation measures include but are not limited to:

- Winning the support of our regulators including NRW, The Welsh Government and Ofwat. The support of our regulators will allow us to progress to detailed feasibility and development of the project, which will reduce the uncertainties outlined above.
- The development of a detailed business case.
- Early purchase of land will reduce uncertainty in availability of the preferred site.
- The risk to water quality and the environment during the commissioning process will be

minimised by a detailed risk assessment and method statement.

- Disruption of additional pipeline installation will be mitigated by working with the local community to minimise disruption during the building process.
- Early consultation with the public and regular liaison with the council from the project manager and the designer for the site.

We have experience of successfully delivering projects of this nature and magnitude alongside our partners and believe that the risks outlined can be managed to make sure the project is delivered to target and does not adversely impact the interests of our customers.



0 Skm

Figure 4: Proposed transfer route and new WwTW site



# 8 Assurance

### Governance

We have a gateway approval process that all capital projects must pass through to ensure there is sufficient scrutiny and challenge from senior management.

There are six stages of the capital investment process and a gateway between each stage. The gateway defines the requirements that are to be met before a project can be approved to move to the next stage. The gateways are as follows:

- 1. Commit to risk;
- 2. Commit to feasibility;
- 3. Commit to solution;
- 4. Commit to delivery / start on site; and
- 5. Commit to handover.

Our Capital Programme Board (CPB) has the delegated authority to approve projects through the gateways. The approach provides strong governance for approving investment decisions and is transparent and fully auditable.

The Gwili Gwendraeth Wastewater Treatment Scheme has passed through Gateway 1 and Gateway 2 and feasibility is now complete. Environmental studies are currently ongoing and progression through gateway 3 into detailed design is scheduled for April 2019.

## Cost assurance

We have taken steps to provide accurate scheme costs which were derived from our Unit Cost Database (UCD), included in the feasibility report by Mott Macdonald Bentley (MMB), which can be provided on request.

Firstly, the UCD model is updated annually and externally verified every five years to make sure that costs remain current. This assurance was undertaken by Mott MacDonald by comparing to 'industry average' from blending a selection of other water companies' cost information. Secondly, we have also appointed independent cost consultants, WRc, to review the costs in our feasibility report that were derived from our UCD for the Gwili Gwendraeth Wastewater Treatment Scheme.

The independent assessment arrived at costs that were within 6% of our estimates. This assurance provides us with confidence that our costs are realistic and robust. We plan to continually review the costs of the scheme as we develop the scheme and move into the detailed design phases. We will seek to drive cost efficiencies in order to keep customer bills affordable.

## Customer consultation assurance

Our customers have indicated that they are very supportive of investments to improve river quality. Protecting our essential wastewater assets is also critical to our customers, who recognise their importance for the continuation of our service provision. The approach that we have taken to seek our customer views has been reviewed by our Customer Challenge Group.

# Monitoring and future assurance

#### Measures of success

We have created new MOS to monitor the success that these measures bring, these include assessing against:

• Environment: km of river improved

#### Future assurance

We have strong governance procedures for the planning and delivery of our capital investment. We will make sure that the required processes are in place to assure the successful delivery of this important project.



# References

- <sup>i</sup> Summer Consultation, Welsh Water 2050, 2017 <sup>ii</sup> WTP Qualitative research, Welsh Water
- Consultation, August 2016.
- <sup>iii</sup> Water2050 Qualitative, Welsh Water consultation, July 2017 & Performance targets qualitative, Welsh Water consultation, June 2017.

<sup>iv</sup> Performance targets qualitative, Welsh Water Consultation. June 2017.

<sup>v</sup> Performance targets qualitative, Welsh Water consultation, June 2017.

 <sup>vi</sup> Office for National Statistics (ONS), 2016, Local Authority-level, 2014-based, Population Projections
 <sup>vii</sup> Carmarthenshire County Council, 2018, Cross Hands Growth Zone [online] <u>http://www.carmarthenshire.gov.wales/home/busine</u> <u>ss/development-investment/cross-hands-growth-</u> <u>zone/#.WtnCesgvyUk</u> (accessed 20/04/18)
 <sup>viii</sup> Gwili / Gwendraeth Feasibility and WFD / Biodiversity Study - Feasibility Study Report, MMB/DCWW, 2018